

Comprehensive Analysis of the Socio-Economic Situation of Zhejiang Province

-- Based on the disposable income of residents in Zhejiang Province

Yida Ren *

Henan University, Accounting, China

* **Corresponding author:** Yida Ren (Email: 1293098511@qq.com)

Abstract: Socialism with Chinese characteristics has entered a new era, and achieving high-quality economic development is an important task for building a modern socialist country in an all-round way. The report of the 20th National Congress of the Communist Party of China pointed out that consumption and disposable income play a key role in economic development. This paper uses two statistical analysis methods, descriptive statistics and linear regression analysis, and analyzes the socio-economic and economic situation of Zhejiang Province in China according to the economic and social development index of residents' disposable income, and analyzes the problems of economic and social development faced by Zhejiang Province and discusses solutions, so as to promote the comprehensive, sustainable and healthy social and economic development of Zhejiang Province.

Keywords: Disposable income of residents in Zhejiang Province, Socio-economic analysis, Descriptive statistics, Linear regression analysis.

1. Introduction

1.1. Background and Significance

First of all, Zhejiang Province has a special geographical location, located on the southeast coast of China and the southern wing of the Yangtze River Delta, with strong overall economic and financial strength, which is at the leading level in China, with a total GDP of 7,771.5 billion yuan in 2022. Therefore, the analysis of the economic development of Zhejiang Province is an indispensable link, and it can be used as a reference for the development of various regions in Zhejiang Province.

Second, Zhejiang Province is currently in a climax period of economic construction and development. The province is undergoing economic transformation and developing in the direction of "building a modern economic system". Therefore, Zhejiang Province has established seven major industrial transformations: information, environmental protection, health, tourism, fashion, finance, and high-end equipment manufacturing. How Zhejiang Province can seize this development opportunity is a particularly important issue.

Finally, the impact of the epidemic has brought different degrees of impact and impact on the social and economic operation of prefecture-level cities in Zhejiang Province. In terms of economy and finance, the GDP of Lishui City and Huzhou City was relatively affected by the epidemic, and Taizhou City's fiscal revenue declined more in 2020. Except

for Zhoushan, the GDP growth rate of all prefecture-level cities in Zhejiang Province in 2020 declined to a certain extent compared with 2019.

Therefore, in this context, this paper selects the disposable income of residents in Zhejiang Province, which is suitable for the economic development of Zhejiang Province, and uses two statistical methods, descriptive statistics and linear regression analysis, to select the index data related to the economic and social development of Zhejiang Province in recent years, and compare them with the actual daily observations, so as to accumulate experience for the future economic and social development of Zhejiang Province and give reasonable and feasible development suggestions.

2. Comprehensive Evaluation and Analysis of Economic Development in Zhejiang Province

2.1. Data Sources and Processing

On the basis of synthesizing the existing research work, this paper preliminarily selects the following six factors from 2000 to 2021 as the explanatory variables of disposable income (Y) of residents in Zhejiang Province by querying the statistical yearbooks of the National Bureau of Statistics and the statistical yearbooks of the Zhejiang Provincial Bureau of Statistics, as shown in Table 1.

Table 1. Data display

Year	X1	X2	X3	X4	X5	X6	Y
2000	10954.7	95	5027	100280.1	12581.51	39.8	9721
2001	12205.4	103.6	5350	110863.1	15301.38	41.2	10070
2002	13638.1	133.7	6089	121717.4	17636.45	42.2	14532
2003	15329.6	187.7	6587	137422	20017.31	42	15007
2004	17615	239.1	7280	161840.2	24165.68	41.2	15661
2005	20627.1	306.8	8068	187318.9	28778.54	41.3	16385
2006	24262.3	377.5	8851	219438.5	34804.35	41.8	17229
2007	29471.5	447.8	10196	270092.3	45621.97	42.9	18584
2008	35289.5	512.0	11489	319244.6	54223.79	42.9	20957
2009	40288.2	531.1	12558	348517.7	59521.59	44.4	25977
2010	47269.9	575.4	13821	412119.3	73210.79	44.2	27359
2011	59954.7	608.2	15554	487940.2	89738.39	44.3	28971
2012	70914.2	624.7	17107	538580	100614.3	45.5	29550
2013	93064.3	638.7	18488	592963.2	110530.7	46.9	30851
2014	102817.2	659.4	19968	643563.1	119175.3	48.3	32658
2015	112007.8	680.9	21392	688858.2	124922.2	50.8	35537
2016	120074.8	704.2	23079	746395.1	130360.7	52.4	38529
2017	129889.1	735.8	24445	832035.9	144369.9	52.7	42046
2018	141480	753.3	26112	919281.1	156402.9	53.3	45840
2019	154296.1	758.5	28063	986515.2	158000.5	54.3	49899
2020	164126.9	797.2	27007	1013567	154312.3	54.5	52397
2021	180817.5	826.5	30307	1143670	172730.5	53.3	57541

X1: The total wages of employed persons in urban units in Zhejiang Province (100 million yuan), which refers to the wage level of employees in a certain period of time, which can be used to reflect the social distribution.

X2: The number of graduates of regular colleges and universities (10,000 people) reflects the development of social education and the composition of personnel. Educational attainment affects the income of residents, and usually those with higher education have higher income levels.

X3: Per capita consumption expenditure of urban residents (1 yuan), the larger the per capita consumption expenditure of urban residents, the higher the consumption level, the more consumption, and the higher the disposable income of residents.

X4: Gross domestic product of Zhejiang Province (100 million yuan), which is equal to the sum of the added value of various industries, reflects the overall economic development level of Zhejiang Province.

X5: Tax (100 million yuan), tax directly affects residents' disposable income.

X6: Composition of the Tertiary Industry-Value-added of the Tertiary Industry (%).

Y: Per Capita Disposable Income of Zhejiang Province (1 yuan).

Note: When selecting explanatory variables, taking into account the impact of the overall macroeconomy on the regional economy and the universality of macroeconomic policies, the national overall indicators are selected for some indicators.

2.2. Descriptive Statistics

Firstly, the concentration trend and dispersion degree of the data are generalized, and the overall characteristics of the data are understood by calculating the minimum, maximum, mean

and standard deviation of the explanatory variables and the explained variable, and the results are shown in Table 2.

Table 2. Descriptive statistics of major variables

Variables	Min	Max	Mean	SD
X1	10954.7	180817.5	72563.36	56607.79
X2	95	826.51	513.5	239.71
X3	5027	30307	15765.36	8245.12
X4	100280.1	1143670	499192	332440.7
X5	12581.51	172730.5	83955.5	55074.23
X6	39.8	54.5	46.37	5.08
Y	9721	57541	28877	14139.89

As can be seen from Table 2, among the three explanatory variables X1, X4 and X5 with the same unit (100 million yuan), the range and standard deviation of X4 are the largest, and the range and standard deviation of X1 and X5 are relatively small, indicating that the dispersion degree of X4 is high, and the dispersion degree of X1 and X5 is relatively low. In addition, the mean and standard deviation of the explanatory variable Y (i.e., disposable income of residents in Zhejiang Province) are 28877 and 14139.89, respectively, indicating that the average disposable income of residents in Zhejiang Province from 2000 to 2021 is 28877 yuan, and there are large differences in the annual disposable income of residents in different years.

Next, a longitudinal comparison of the disposable income of residents in Zhejiang Province in the past 20 years is made, and a line chart is drawn, as shown in Figure 1.

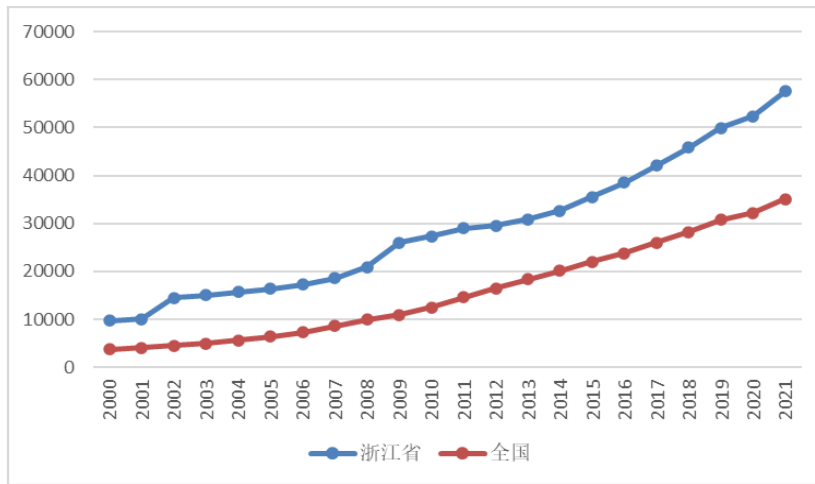


Figure 1. Line chart of disposable income between Zhejiang Province and China from 2000 to 2021

As can be seen from Figure 1, the disposable income of residents in Zhejiang Province has been steadily increasing from 2000 to 2021, and it is higher than the overall national level. There are three main reasons for this.

First of all, from the perspective of industrial status, almost every city in Zhejiang Province has its own pillar industry. For example, Hangzhou, the capital of the Internet, Huzhou, the capital of brushes, Yiwu, the capital of small commodities, and so on.

Secondly, from the perspective of geographical location, Zhejiang Province is located in the southeast coastal area of China, with convenient water transportation, many ports and frequent foreign trade; And the terrain is relatively flat, which is conducive to the construction of transportation and perfect transportation facilities. At the same time, the southeast coastal area, as a pioneer area of reform and opening up, is supported by relevant national policies.

In addition, private enterprises in Zhejiang Province have a long history of development and good development status,

and private entrepreneurs have a strong spirit of innovation. The development of the private economy in Zhejiang Province started in the early 80s of the 20th century, and has roughly experienced the initial development stage in the early stage of reform and opening up, the rapid development stage in the mid-to-late 80s of the 20th century, the comprehensive development stage after the 14th National Congress of the Communist Party of China, the improvement development stage after the 15th National Congress of the Communist Party of China, and the transformation and upgrading stage after the 17th National Congress of the Communist Party of China. After these stages of improvement and development, private enterprises in Zhejiang Province have realized the leap from agricultural economy to industrial economy.

Next, the disposable income of residents in each provincial-level administrative region in the same year (2022) is compared horizontally and a bar chart is drawn, as shown in Figure 2.

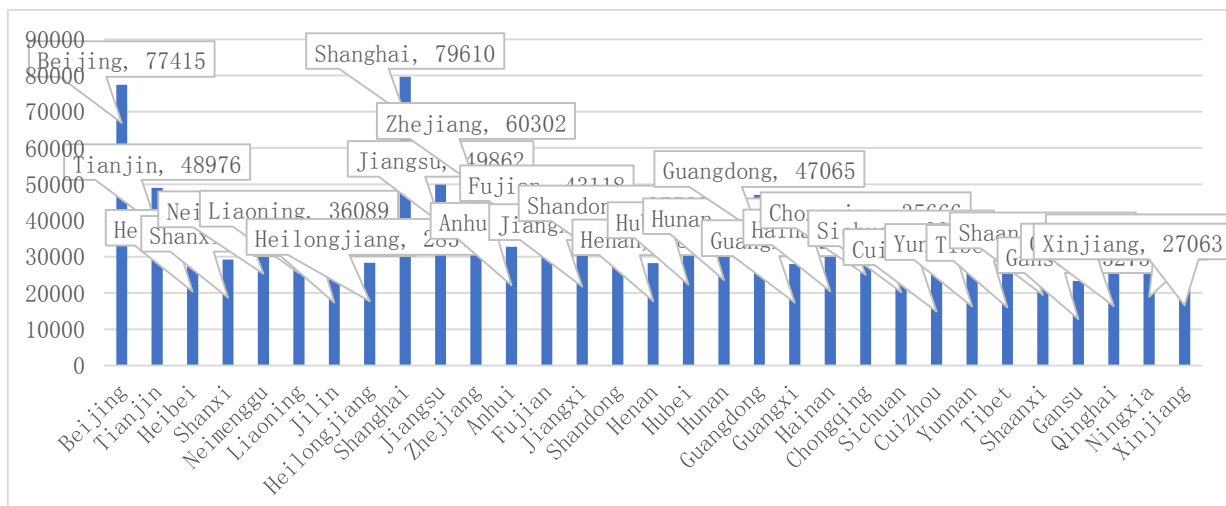


Figure 2. Disposable income of residents in 2022 by provincial-level administrative region

As can be seen from Figure 2, the top three provincial-level administrative regions in terms of disposable income in 2022 are Shanghai, Beijing, and Zhejiang.

As the largest economic center in China, Shanghai has the same advantages as an international metropolis. First of all, historically, the Shanghai metropolitan area has been highly

prosperous since ancient times, since the construction of the Grand Canal in the Sui Dynasty, China's economic hinterland has been transferred from the Central Plains including Chang'an and Luoyang to the Jiangnan region, the Southern Song Dynasty began to become a highly prosperous place for world commerce, Suzhou became the national economic

center during the Ming and Qing dynasties, and the modern economic center of China was transferred from Suzhou to Shanghai. Secondly, Shanghai has strong industrial strength, and its industrial clusters and industrial chains rank among the top in the country and even the world. Therefore, in 2022, the disposable income of Shanghai residents ranked first among all provincial-level administrative regions.

As the capital of China, Beijing ranked second in terms of disposable income in 2022. In terms of economic advantages, Beijing is one of China's economic centers, with many headquarters of state-owned and private enterprises. In terms of educational advantages, Beijing has many well-known higher education institutions, such as Tsinghua University and Peking University. These universities have an important position in China and even in the world, attracting many domestic and foreign students to study and research, and cultivating many high-quality talents. As a result, in 2022, the disposable income of residents in Beijing ranked second among all provincial-level administrative regions.

In 2022, Zhejiang Province ranked third among provincial-level administrative regions in terms of disposable income, for the following reasons. First, Zhejiang Province has a profound historical and cultural heritage. Zhejiang has been a prosperous place in our country since ancient times, and "the southeast shape wins, the three Wu capitals, and Qiantang has been prosperous since ancient times" refers to the area of Zhejiang. Second, Zhejiang Province has outstanding people, celebrities, since ancient times is a place of developed education in China, the quality of the population is high, the number of champions from Zhejiang in ancient times is second only to Jiangsu, after the founding of New China, the number of academicians from Zhejiang and the Chinese Academy of Sciences is second only to Jiangsu. Third, Zhejiang Province has superior geographical location and natural environment. Zhejiang Province is located in the southeast coast of China, is the forefront of China's reform and opening up, by the north of Zhejiang, Shanghai, southern Jiangsu Yangtze River Delta is one of the most economically developed regions in China. Fourth, the diligent spirit and the characteristics of Zhejiang people who are good at doing business are also one of the reasons.

2.3. Analysis of Influencing Factors Based On Multiple Linear Regression

2.3.1. Correlation Analysis

The correlation coefficient is a statistic calculated from the sample data that measures the strength of the linear relationship between two variables. Table 3 shows the Pearson correlation coefficient matrix between the six explanatory variables and one explanatory variable (i.e., the per capita disposable income of residents in Zhejiang Province).

Table 3. Pearson correlation coefficient matrix

	X1	X2	X3	X4	X5	X6	Y
X1	1	0.9	0.99	0.99	0.98	0.98	1
X2	0.9	1	0.94	0.92	0.95	0.88	0.92
X3	0.99	0.94	1	1	1	0.98	1
X4	0.99	0.92	1	1	0.99	0.97	1
X5	0.98	0.95	1	0.99	1	0.97	0.99
X6	0.98	0.88	0.98	0.97	0.97	1	0.98
Y	1	0.92	1	1	0.99	0.98	1

As can be seen from Table 3, there is a high positive correlation between the influencing factors and the per capita disposable income of residents.

2.3.2. Multicollinearity Test

The multiple linear regression model was established by the traditional least squares method, and the variance expansion factor of each explanatory variable was calculated $VIF_i = 1 / (1 - R_i^2)$, see Table 4. Typically, if the VIF is greater than 10, it is considered to have severe multicollinearity.

Table 4. Variance expansion factor

	X1	X2	X3	X4	X5	X6
x	729.32	362.54	3279.09	1993.41	513.19	122.16

As can be seen from Table 4, there is a serious multicollinearity between the variables.

2.3.3. Model Construction and Analysis

Multiple linear regression analysis focuses on the quantitative relationship between variables, and describes this relationship through certain mathematical expressions, and then determines the degree of influence of changes in several variables (independent variables) on another specific variable (dependent variable), which is an effective method to explore the correlation and dependence between variables. The population regression model reflects the general trend of the relationship between variables, and the linear population regression model is the most common population regression model because it is simple in form and relatively easy to estimate and test parameters. The general form of a multiple linear regression model is:

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \dots + \beta_k X_k + \varepsilon \quad (i = 1, 2, \dots, n)$$

Where Y is the explanatory variable, X_1, X_2, \dots, X_k is the explanatory variable, $\beta_0, \beta_1, \beta_2, \dots, \beta_k$ is the parameter to be estimated, i.e., the regression coefficient; ε is a random error term; k is the number of explanatory variables; i is the subscript of the observation; n is the sample size.

Due to the different dimensions of these six explanatory variables (the units are not uniform among them), in order to eliminate the influence of dimensions on the analysis results, the original data were normalized to eliminate the dimensions before multiple linear regression analysis, as shown in Table 5.

Table 5. Normalized data

Year	X1	X2	X3	X4	X5	X6	Y
2000	-1.09	-1.75	-1.30	-1.20	-1.30	-1.29	-1.18
2001	-1.07	-1.71	-1.26	-1.17	-1.25	-1.02	-1.15
2002	-1.04	-1.58	-1.17	-1.14	-1.20	-0.82	-1.10
2003	-1.01	-1.36	-1.11	-1.09	-1.16	-0.86	-1.06
2004	-0.97	-1.14	-1.03	-1.01	-1.09	-1.02	-0.99
2005	-0.92	-0.86	-0.93	-0.94	-1.00	-1.00	-0.92
2006	-0.85	-0.57	-0.84	-0.84	-0.89	-0.90	-0.84
2007	-0.76	-0.27	-0.68	-0.69	-0.70	-0.68	-0.70
2008	-0.66	-0.01	-0.52	-0.54	-0.54	-0.68	-0.57
2009	-0.57	0.07	-0.39	-0.45	-0.44	-0.39	-0.47
2010	-0.45	0.26	-0.24	-0.26	-0.20	-0.43	-0.32
2011	-0.22	0.40	-0.03	-0.03	0.11	-0.41	-0.12
2012	-0.03	0.46	0.16	0.12	0.30	-0.17	0.08
2013	0.36	0.52	0.33	0.28	0.48	0.10	0.25
2014	0.53	0.61	0.51	0.43	0.64	0.38	0.44
2015	0.70	0.70	0.68	0.57	0.74	0.87	0.61
2016	0.84	0.80	0.89	0.74	0.84	1.19	0.80
2017	1.01	0.93	1.05	1.00	1.10	1.24	1.01
2018	1.22	1.00	1.25	1.26	1.32	1.36	1.23
2019	1.44	1.02	1.49	1.47	1.34	1.56	1.48
2020	1.62	1.18	1.36	1.55	1.28	1.60	1.62
2021	1.91	1.31	1.76	1.94	1.61	1.36	1.91

In this paper, we collected various relevant indicators of Zhejiang Province from 2000 to 2021, and established a multiple regression model with per capita disposable income Y as the explanatory variable and six indicators in Table 1 as the explanatory variables:

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \beta_6 X_6 + \varepsilon$$

Among them, the ε is a random error term, which obeys a normal distribution and is independent of each other, i.e., $\varepsilon \sim N(0, \sigma^2)$.

Next, multiple linear regression analysis was performed in Excel (with a specified significance level of 0.05) and the output results are shown in Table 6.

Table 6. Regression analysis results output by Excel

Regression statistics						
Multiple R		0.996966				
R Square		0.993941				
Adjusted R Square		0.992515				
Standard error		1223.306				
Observations		22				
analysis of variance						
	df	SS	MS	F	Significance F	
Regression analysis	6	21.00090124	3.500150207	18789.6218	3.43354E-28	
Residuals	15	0.002794216	0.000186281			
Total	21	21.00369545				
Standard error						
	Coefficients		t Stat	P-value	Lower 95%	Upper 95%
Intercept	0.00053725	0.00291066	0.184579968	0.856030861	0.00566668	0.006741175
X Variable 1	0.267078769	0.047030943	5.678788275	4.37649E-05	0.16683469	0.367322852
X Variable 2	0.032738659	0.015964622	2.050700607	0.058191624	0.00128913	0.066766445
X Variable 3	0.004079179	0.088285302	0.046204504	0.963756789	0.18409649	0.192254846
X Variable 4	0.760605869	0.061744132	12.31867458	3.01878E-09	0.62900137	0.892210372
X Variable 5	-0.13685076	0.041048063	3.333915197	0.004532443	0.22434263	0.049358885
X Variable 6	0.07630142	0.019614641	3.890023815	0.001450449	0.0344938	0.118109037

The following conclusions can be drawn from Table 6:

Firstly, through the regression statistics table in the Excel output results, it can be seen that the value of the R Square (decision coefficient) of the model is 0.993941, which is close to 1, indicating that the model has a good fitting effect on the sample data. Secondly, from the table of regression parameters in the Excel output results, it can be seen that the

estimated multiple linear regression equation is:

$$Y = 0.00053725 + 0.267078769X_1 + 0.032738659X_2 + 0.004079179X_3 + 0.760605869X_4 - 0.13685076X_5 + 0.07630142X_6$$

From this equation, it can be seen that X1, X2, X3, X4 and X6 are positively correlated with the disposable income of

residents in Zhejiang Province, and X5 is negatively correlated with the disposable income of residents in Zhejiang Province, that is, the higher the wages of urban employees in Zhejiang Province, the higher the number of graduates from ordinary colleges and universities, the higher the per capita consumption expenditure of urban residents, the higher the GDP of Zhejiang Province, and the more the added value of the tertiary industry, the higher the disposable income of residents in Zhejiang Province. Conversely, the higher the tax revenue, the lower the disposable income of residents in Zhejiang Province. Therefore, the relevant government departments can vigorously develop the national economy and higher education by adjusting the industrial composition, and adjust the tax structure to promote the increase of residents' income.

In addition, the analysis of variance table and regression parameter table in the Excel output results were used to test the linear relationship and regression coefficient, respectively. Firstly, the significance test of the linear relationship was performed. The first step is to formulate a hypothesis, $H_0: \beta_1 = \beta_2 = \beta_3 = \beta_4 = \beta_5 = \beta_6$ (the linear relationship between the explanatory variable and the explanatory variable is not significant); $H_1: \beta_1, \beta_2, \beta_3, \beta_4, \beta_5, \beta_6$ at least one of them is not 0 (the linear relationship between the explanatory variable and the explanatory variable is significant). In the second step, determine the test statistic F; the third step is to make statistical decisions. According to the ANOVA table, F Significance=3.43354E-28 is less than 0.05, rejecting null hypothesis H_0 and accepting alternative hypothesis H_1 , indicating that the linear relationship between the explanatory variable and the explanatory variable is significant, but it does not mean that the relationship between the disposable income of residents in Zhejiang Province and each explanatory variable is significant.

Then, the significance of the regression coefficient was tested. The first step is to put forward the hypothesis, $H_0: \beta_i = 0$ (the explanatory variable has no significant effect on the explanatory variable), $H_1: \beta_i \neq 0$ (the explanatory variable has a significant effect on the explanatory variable), the second step is to determine the test statistic t, and the third step is to make a statistical decision. From the regression parameter table, it can be seen that the P values corresponding to $\beta_1, \beta_4, \beta_5, \beta_6$ are less than 0.05, indicating that the four explanatory variables X1, X4, X5, and X6 have a significant impact on the disposable income of residents in Zhejiang Province. The P value corresponding to β_2, β_3 is greater than 0.05 and fails the test, but this does not necessarily mean that the impact of X2 and X3 on the disposable income of residents in Zhejiang Province is not significant, because this may be due to multicollinearity.

3. Conclusions and Policy Recommendations

3.1. Conclusion

This paper selects the disposable income of residents in Zhejiang Province as a specific economic indicator, and selects six variables that can explain the economic index,

firstly uses descriptive statistics to summarize the data, and compares the disposable income of residents horizontally and vertically. Then, multiple linear regression analysis was used to obtain the regression analysis results, and the significance test was performed. The results show that: (1) the disposable income of residents in Zhejiang Province gradually increased from 2000 to 2021 and was higher than the national level; (2) In 2022, the disposable income of residents in Zhejiang Province ranked third among provincial-level administrative regions in China; (3) There was a positive correlation between the wages of urban employees, the number of graduates from ordinary colleges and universities, the per capita consumption expenditure of urban residents, the GDP of Zhejiang Province and the added value of the tertiary industry and the disposable income of residents in Zhejiang Province. There is a negative correlation between taxation and disposable income of residents in Zhejiang Province. (4) The linear relationship between the six explanatory variables and the disposable income of residents in Zhejiang Province was significant. (5) The four explanatory variables of total wages of urban employees in Zhejiang Province, GDP of Zhejiang Province, tax revenue and added value of the tertiary industry have a significant impact on the disposable income of residents in Zhejiang Province.

3.2. Policy Recommendations

First, government departments should increase residents' disposable income by promoting employment, continuously adjusting and optimizing the industrial structure, and adjusting tax policies, promote sustained, healthy and high-quality economic development, and strive to build a modern socialist country.

Second, Zhejiang Province should continue to give full play to its historical and geographical advantages, strengthen all-round cooperation with the Yangtze River Delta urban agglomeration, support the development of private enterprises, and promote the development of higher education, so as to achieve the organic unity of economic, cultural and social construction.

Third, entrepreneurs in Zhejiang Province should continue to carry forward the entrepreneurial spirit and innovative spirit and devote themselves to the construction of a new era of socialism with Chinese characteristics.

References

- [1] Chen Yujuan, Zou Yundong, Wang Jiawei. Correlation analysis between strategic emerging industries and economic development in Zhejiang Province [J]. Statistical Science and Practice, 2021(08):27-31.
- [2] Ni Qingran, Han Minghua. Urbanization, economic development and urban-rural income gap in Zhejiang Province: Based on spatial panel data analysis of 11 cities in Zhejiang Province [J]. Future and Development, 2021, 45(08):103-112.
- [3] Nian Yan, Pan Jianlin. An empirical analysis of the relationship between logistics industry agglomeration and economic development in Zhejiang Province [J]. Enterprise Science and Technology and Development, 2019(08):37-39+41.